RAW SEQUENCE LISTING

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) no errors detected.

| Application Serial Number: | 10/590, 705 |
|----------------------------|-------------|
| Source: | IFWO. |
| Date Processed by STIC: | 09/05/2006 |
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IFWO

RAW SEQUENCE LISTING DATE: 09/05/2006
PATENT APPLICATION: US/10/590,705 TIME: 15:10:31

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3 <110> APPLICANT: KYOWA HAKKO KOGYO CO., LTD 5 <120> TITLE OF INVENTION: Method for producing amino acid 7 <130> FILE REFERENCE: 1657 C--> 9 <140> CURRENT APPLICATION NUMBER: US/10/590,705 C--> 9 <141> CURRENT FILING DATE: 2006-08-25 9 <160> NUMBER OF SEQ ID NOS: 16 10 <170> SOFTWARE: PatentIn Ver. 3.1 12 <210> SEQ ID NO: 1 13 <211> LENGTH: 30 14 <232 TYPE: DNA 15 <213> ORGANISM: Artificial 17 <220> FEATURE: 18 <223> OTHER INFORMATION: Synthetic DNA 20 <400> SEQUENCE: 1 21 ctgcttgccc tgcaggtgca ccagcaaacg 30 23 <210> SEQ ID NO: 2 24 <211> LENGTH: 30 25 <212> TYPE: DNA 26 <213> ORGANISM: Artificial 28 <220> FEATURE: 29 <223> OTHER INFORMATION: Synthetic DNA 31 <400> SEQUENCE: 2 32 cgagctgcgc gacaaccagg aattcagcgg 30 34 <210> SEQ ID NO: 3 . 35 <211> LENGTH: 1404 36 <212> TYPE: DNA 37 <213> ORGANISM: Corynebacterium glutamicum ATCC13032 39 <220> FEATURE: 40 <221> NAME/KEY: CDS W--> 41 <222> LOCATION: 43 <400> SEQUENCE: 3 44 atg tca gtt aac cca acc cgc ccc gaa ggc ggc cgt cac cac gtc gtc 48 45 Met Ser Val Asn Pro Thr Arg Pro Glu Gly Gly Arg His His Val Val 46 10 96 49 Val Ile Gly Ser Gly Phe Gly Gly Leu Phe Ala Ala Lys Asn Leu Ala 50 25 20 52 aag gca gac gtc gat gtc act ctg att gac cgc acc aac cac ctc 144 53 Lys Ala Asp Val Asp Val Thr Leu Ile Asp Arg Thr Asn His His Leu 54 35 45 56 ttc cag cca ctg ctg tac caa gtg gca acc ggt atc ctc tcc tcc ggt 192 57 Phe Gln Pro Leu Leu Tyr Gln Val Ala Thr Gly Ile Leu Ser Ser Gly

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58

| 60 9 | gaa | atc | gca | cct | tcc | act | cga | cag | atc | ctg | ggc | tcc | cag | gaa | aac | gtc | 240 | | | | |
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| 62 | 65 | | | | | 70 | | | | | 75 | | | | | 80 | | | | | |
| 64 8 | aac | gtc | atc | aag | ggc | gaa | gtc | acc | gac | atc | aac | gtc | gag | tcc | cag | act | 288 | | | | |
| 65 <i>I</i> | Asn | Val | Ile | Lys | Gly | Glu | Val | Thr | Asp | Ile | Asn | Val | Glu | Ser | Gln | Thr | | | | | |
| 66 | | | | | 85 | | | | | 90 | | | | | 95 | | | | | | |
| 68 9 | gtg | acc | gcc | tcc | ctg | ପ୍ରପ୍ | gag | ttc | acc | cgc | gtt | ttt | gag | tac | gat | tcc | 336 | *** | , | • | |
| 69 1 | Val | Thr | Ala | Ser | Leu | Gly | Glu | Phe | Thr | Arg | Val | Phe | Glu | Tyr | Asp | Ser | | e e e | • | ٠ | • • |
| 70 | | | | 100 | | | | | 105 | _ | | | | 110 | _ | | | | | | |
| 72 t | ttg | gtc | gtt | ggt | gct | ggc | gca | ggt | cag | tcc | tac | ttc | ggc | aat | gat | cac | 384 | | | | |
| | = | | | | _ | _ | | | | | | | Gly | | = | _ | | | | | |
| 74 | | • | 115 | | | | | 120 | | | | | 125 | | | | | | | | |
| 76 1 | ttc | gct | gag | ttc | gca | cct | ggc | atg | aag | tcc | atc | gac | gat | gca | ctg | gag | 432 | • | | | |
| 77 1 | Phe | Ala | Glu | Phe | Ala | Pro | Gly | Met | Lys | Ser | Ile | Asp | Asp | Ala | Leu | Glu | | | | | |
| 78 | | 130 | | | | | 135 | | | | | 140 | | | | | | | | | |
| 80 a | att | cgt | gca | cgc | atc | atc | ggt | gct | ttc | gag | cgc | gct | gag | atc | tgc | gag | 480 | • | | | |
| 81 | Ile | Arg | Ala | Arg | Ile | Ile | Gly | Ala | Phe | Glu | Arg | Ala | Glu | Ile | Cys | Glu | | | | | |
| 82 | 145 | | | | | 150 | | | | | 155 | | | | | 160 | | | | | |
| 84 | gat | cca | gct | gag. | rgc | gaa | .ರಚ್ಞ | ctg | ctc | acc | ttc | gtc | gtt | gtt | ggc | gct | 528 | 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1 | • | | |
| 85 2 | Asp | Pro | Ala | Glu | Arg | Glu | Arg | Leu | Leu | Thr | Phe | Val | Val | Val | Gly | Ala | | ر ۱۰۰۰ و د میرهای | | | |
| 86 | | | | | 165 | | | | | 170 | | | | | 175 | | | | | | |
| 88 | ggc | cca | acc | ggt | gtt | gag | ctt | gct | ggc | cag | ttg | gct | gag | atg | gct | cac | 576 | | | | |
| 89 (| Gly | Pro | Thr | Gly | Val | Glu | Leu | Ala | Gly | Gln | Leu | Ala | Glu | Met | Ala | His | | | | | |
| 90 | | | | 180 | | | | | 185 | | | | | 190 | | | | | | | |
| 92 (| cgc | acc | ctt | gct | ggt | gag | tac | aag | aac | ttc | aac | acc | aac | tcc | gca | aag | 624 | | | | |
| 93 2 | Arg | Thr | Leu | Ala | Gly | Glu | Tyr | Lys | Asn | Phe | Asn | Thr | Asn | Ser | Ala | Lys | | | | | |
| 94 | | | 195 | | | | | 200 | | | | | 205 | | | | | | | | |
| | | | _ | | _ | | _ | | _ | _ | | , | | | | _ | · 672 | | | | |
| 97 | Ile | Ile | Leu | Leu | Asp | Gly | Ala | Pro | Gln | Val | Leu | Pro | Pro | Phe | Gly | Lys | | | | | |
| 98 | | 210 | | | | | 215 | | | | | 220 | | | | | | | | | |
| | _ | | | _ | | _ | | | | _ | | _ | _ | | _ | c aac | 720 | | | | |
| | _ | | ı Gly | Arg | g Asr | | | ı Arç | y Thr | Leu | | _ | s Met | : Gly | y Va. | l Asn | | | | | |
| | 225 | | | | _ | 230 | | | | | 235 | | | | | 240 | | | | | |
| | _ | | _ | | | _ | _ | | | _ | _ | _ | | _ | | c acc | 768 | | | | |
| | | . Arc | y Leu | ı Ası | | | : Val | Thi | Asn | | - |) Ala | a Thr | : Sei | | l Thr | | | | | |
| 106 | | | | | 245 | | | | | 250 | | | | | 25 | | 0.1.6 | | | | |
| | | | _ | _ | | | _ | | | | | | | | _ | c aag | 816 | | | | |
| | - | . rys | i Thi | - | _ | O GIZ | 7 GIU | ı GIL | | | c TTE | GII | ı Ser | | _ | s Lys | | | | | |
| 110 | | | | 260 | | | | | 265 | | | | | 270 | | | 064 | | | | |
| | | | = | | | | T . T | | | | _ | | | | _ | c gca | 864 | | | | |
| | тте | TIL | | | а Сту | / val | L Ale | | | PIC | э тег | ı Gız | | | ı va. | l Ala | | | | | |
| 114 | | | 275 | | | | | 280 | | | | | 285 | | | | 010 | | | | |
| | | | | | _ | | | _ | _ | | | _ | _ | | | t aac | 912 | | | | |
| | | | | . GT. | val | . GIL | | _ | Arc |) AIS | a GIS | _ | - | . Met | . va. | l Asn | | | | | |
| 118 | | 290 | | . <u>.</u> | | سعر | 295 | | | | , <u>.</u> | 300 | | 4 ـ ـ ـ ـ ـ | | a | 0.00 | | | | |
| | _ | _ | _ | - | _ | | _ | _ | _ | | _ | | _ | | | gac | 960 | | | | |
| | _ | _ | ь пец | ı sei | . val | | _ | , GII | т тух | ASI | _ | | . val | . va. | r GT | y Asp | • | | | | |
| | 305 | | | | | 310 | | المستميد | المحمد ا | | 315 | | | | , , , , , , | 320 | 1000 | | | | |
| 124 | atg | atç | _j aac | ; tac | ; aac | : aac | CCC | cct | , ggt | . gtt | . gct | . caç | y gta | r acs | a ato | c cag | 1008 | | | | |

| | 125 126 | Met | Met | Asn | Tyr | Asn 325 | Asn | Leu | Pro | Gly | Val | Ala | Gln | Val | Ala | Ile 335 | Gln | |
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| | 129 | Ser | Gly | Glu | Tyr | Val | Ala | Glu | Gln | Ile | Glu | Ala | Glu | Val | Glu | Gly | Arg | |
| | 130 | | | | 340 | | | | | 345 | | | | | 350 | | | |
| | | | | | | | | gct | | | | • | | | | | | 1104 |
| | 133 | Ser | Asn | | Glu | Arg | Glu | Ala | | Asp | Tyr | Phe | • | | | | | |
| ٩٨٠ | 134 | • | | 355 | | | | ٠ | 360 | | | | •2 | | :'t.s | | | |
| | | ~ | | | | _ | | tcc | _ | | | _ | _ | | _ | _ | | 1152 |
| | | | | | Ser | Arg | Phe | Ser | Ala | Val | Val | Lys | | Gly | Lys | Val | Glu | |
| | 138 | | 370 | | | | | 375 | | 4 | . | LL | 380 | | | | | 1000 |
| | | _ | | | | | — — | tgg | _ | _ | | _ | _ | | | | _ | 1200 |
| | | | Thr | GTÄ | Pne | TTE | _ | Trp | vaı | Leu | Trp | | Ala | vaı | HIS | тте | | |
| | | 385 | a+~ | ~++ | ~~~ | ++- | 390 | 220 | cat | ++- | ata | 395 tag | ~~~ | ata | 200 | taa | 400 | 1248 |
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| | 145 | FIIC | пеп | val | Gry | 405 | Arg | Woll | Arg | FILE | 410 | DOT | AIA | 116 | DCI | 415 | Gry | |
| | | cta | aac | gca | cta | | cac | aag | cat | taa | | cta | gga | acc | acc | | cag | 1296 |
| | | _ | | _ | _ | | _ | _ | _ | | | _ | _ | | | _ | _ | 1270 |
| | • | | • | | | | _ | - <i>y</i> | | | | | | -, -, -, | | , | - | |
| | | | | | | | | acg | | | | | | | | ctt | gag | 1344 |
| | | _ | | | | _ | | Thr | _ | | _ | • | _ | _ | | | | |
| | 154 | | | 435 | | J | | | 440 | | - | | | 445 | | | | |
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| | 158 | | 450 | | | | | 455 | | | | | 460 | | | | | |
| | 160 | agc | gga | aag | taa | | | | | | | | | | | | | 1404 |
| | 161 | Ser | Gly | Lys | | | | | | | | | | • | | | | |
| | 162 | 465 | | | | | | | | | | | | | | | | |
| | | | | EQ II | | | | | | | | | | | | | | |
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| | | | | | | | yneba | actei | cium | grut | | | | | | | | |
| | | | | EQUEI | | | πh∝ | 7 ~~ | D x o | C111 | C] ** | C1** | 7 ~~ | uic | Uic | 7727 | 172] | |
| | 171 | | ser | vaı | ASII | 5 | 1111 | Arg | PIO | GIU | 10 | дту | Arg | UTS | UTD | 15 | vai | |
| | | | Tle | Glv | Ser | | Dhe | Gly | G] v | T. 2 11 | | Δla | Δla | Tays | Asn | | Ala | |
| | 174 | Vai | 116 | Gry | 20 | GLY | FIIC | GLY | GIY | 25 | 1110 | HIG | niu | цуb | 30 | ПСИ | 112.0 | |
| | | Lvs | Ala | Asp | | Asp | Val | Thr | Leu | | Asp | Arg | Thr | Asn | _ | His | Leu | |
| | 177 | -1 | | _ | | _ | | | | | _ | _ | | | | _ | | |
| | | Phe | Gln | | | | | Gln | | | _ | _ | | | Ser | Ser | Gly | |
| | 180 | | 50 | | | • | • | 55 | | | | _ | 60 | | | | _ | |
| | 183 | Glu | Ile | Ala | Pro | Ser | Thr | Arg | Gln | Ile | Leu | Gly | Ser | Gln | Glu | Asn | Val | |
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| | 186 | Asn | Val | Ile | Lys | Gly | Glu | Val | Thr | Asp | Ile | Asn | Val | Glu | Ser | Gln | Thr | |
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| | 189 | Val | Thr | Ala | Ser | Leu | Gly | Glu | Phe | Thr | Arg | Val | Phe | Glu | Tyr | Asp | Ser | |
| | 190 | | | | 100 | | | | | 105 | | | | | 110 | | | |
| | | | _ | | | _ | | Ala | | | _ | | = | - | | _ | • | |

| 193 | | | 115 | | | | | 120 | | | | | 125 | | | |
|-----|------------|-------|-------|-------|------------|-------|------------|------|------|---------|------|-------------|-----|-------|-----|------------|
| | | | | | | | | | Lys | | | | | Ala | Leu | Glu |
| 196 | | 130 | | | | | _ | | -1- | | | 140 | | | | |
| | | | | | | | | | Phe | | | Ala | Glu | Ile | Cys | Glu |
| 199 | | | | | | | _ | | | | | | | | • | 160 |
| | | Pro | Ala | Glu | Arq | | | | Leu | | | | | | Gly | Ala |
| | | | | | _ | | _ | | | | | | | | 175 | |
| | | | | | | | | | Gly | | | | | | Ala | His |
| | _ | | | _ | | | | | _ | | | | | 190 | | |
| | | | | | | | | | Asn | | | | | Ser | Ala | Lys |
| 208 | J | | 195 | , | _ | | _ | 200 | | | | | 205 | | | - |
| 210 | Ile | Ile | Leu | Leu | Asp | Gly | Ala | Pro | Gln | Val | Leu | Pro | Pro | Phe | Gly | Lys |
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| 219 | Tyr | Lys | Thr | Lys | Asp | Gly | Glu | Gļu | His | Thr | Ile | Glu | Ser | Phe | Cys | Lys |
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| 222 | ITe | Trp | Ser | Ala | Gly | Val | Ala | Ala | Ser | Pro | Leu | Gly | Lys | Leu | Val | Ala |
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| 228 | Asp | Asp | Leu | Ser | Val | Gly | Asp | Gln | Lys | Asn | Val | Phe | Val | Val | Gly | Asp |
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| 231 | Met | Met | Asn | Tyr | Asn | Asn | Leu | Pro | Gly | Val | Ala | Gln | Val | Ala | Ile | Gln |
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| 234 | Ser | Gly | Glu | Tyr | Val | Ala | Glu | Gln | Ile | Glu | Ala | Glu | Val | Glu | Gly | Arg |
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| 237 | Ser | Asn | Thr | Glu | Arg | Glu | Ala | Phe | Asp | Tyr | Phe | Asp | Lys | Gly | Ser | Met |
| 238 | | | 355 | | | | | 360 | _ | | | | 365 | | | |
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| | | Thr | Gly | Phe | Ile | _ | Trp | Val | Leu | Trp | | Ala | Val | His | Ile | |
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| | | | ser | ser | Asp | ьeu | | тте | GIU | ьeu | arg | _ | Asn | Gin | Arg | Phe |
| 256 | | 450 | T | | | | 455 | | | | | 460 | | | | |
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| 259 | | ٠. ~- | 70 T | 3 370 | _ | | | | | | | | | | | |
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| 273 Met Thr Asn Thr Pro Phe Arg Pro Glu Gly Gly Arg His His Val Val 274 1 5 1 5 276" gtt att ggc tcc ggc ttc ggt gga cta ttc gca gtt caa aac ctc aaa 277 Val Ile Gly Ser Gly Phe Gly Gly Leu Phe Ala Val Gln Asn Leu Lys 278 20 280 gat gca gat gtc gat atc acc ctc atc gac cgg aca aac cac cac ctt 281 Asp Ala Asp Val Asp Ile Thr Leu Ile Asp Arg Thr Asn His His Leu 282 35 40 284 ttc cag ccg ttg ctt tac caa gta gca acc ggt atc ttg tcg tct ggt 285 Phe Gln Pro Leu Leu Tyr Gln Val Ala Thr Gly Ile Leu Ser Ser Gly 286 50 55 60 288 gaa atc gca cca caa acg cgt caa gtt ctt gca cag caa aat aat gtg 289 Glu Ile Ala Pro Gln Thr Arg Gln Val Leu Ala Gln Gln Asn Asn Val 290 65 70 70 70 70 70 70 70 70 70 70 70 70 70 | | 271 | <400 |)> SI | EQUEN | ICE: | 5 | | | | | | | | | | | | |
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| 276 gtt att ggc tcc ggc ttc ggt gga cta ttc gca gtt caa'aac ctc aaa 277 Val 11e Gly Ser Gly Phe Gly Gly Leu Phe Ala Val Gln Asn Leu Lys 278 20 25 30 30 280 gat gca gat gtc gat atc acc ctc atc gac cgg aca aac cac cac ctt 144 281 Asp Ala Asp Val Asp I1e Thr Leu I1e Asp Arg Thr Asn His His Leu 282 35 40 45 284 ttc cag ccg ttg ctt tac caa gta gta gca acc ggt atc ttg cgt tct ggt 285 Phe Gln Pro Leu Leu Tyr Gln Val Ala Thr Gly I1e Leu Ser Ser Gly 286 50 288 gaa atc gca cac aca acc gct caa gtt ctt gca cag caa aat aat gtg 240 289 Glu I1e Ala Pro Gln Thr Arg Gln Val Leu Ala Gln Gln Asn Asn Val 290 65 70 70 70 70 70 70 70 70 70 70 70 70 70 | | 273 | Met | Thr | Asn | Thr | Pro | Phe | Arg | Pro | Glu | Gly | Gly | Arg | His | His | Val | Val | |
| 277 Val 11e Gly Ser Gly Phe Gly Gly Leu Phe Ala Val Gln Asn Leu Lys 278 | - | .274 | 1 | • | | | 5 | | | | | 10 | | | | | 15 | | |
| 278 | 14 | 276 | gtt | att | ggc | tcc | ggc | ttc | ggt | gga | cta | ttc | gca | gtt | caa" | aac | ctc | aaa | 96 |
| 280 gat gca gat gtc gat atc acc ctc atc gac cgg aca aac cac cac ctt 281 Aap Ala Asp Val Asp Ile Thr Leu Ile Asp Arg Thr Asn His His Leu 282 35 40 45 284 ttc cag ccg ttg ctt tac caa gta gca acc ggt atc ttg tcg tcg gcg 285 Phe Gln Pro Leu Leu Tyr Gln Val Ala Thr Gly Ile Leu Ser Ser Gly 286 50 50 60 288 gaa atc gca cca caa acg cgt cad gt ctt tac caa gta gt ctt gcg cag aca aat aat gtg 280 Glu Ile Ala Pro Gln Thr Arg Gln Val Leu Ala Gln Gln Asn Asn Val 290 65 70 80 95 292 cac gtt ctt aag gct gaa gtc acc ga act gac act gaa act ga acg aag acg 293 His Val Leu Lys Ala Glu Val Thr Asp Ile Asp Thr Glu Ser Lys Thr 294 85 90 95 296 gtc gca gac ttg gat gat tat tct aaa aca aca acg cgt ada acc act gaa acc act gaa acc act gaa acc act gac act gat cac and aca act gat cac gar acc act gac act acc aca aca acc act gac act gat cac gat cac act gac act gat gat cac acc act gac act gat gat cac acc act gac act gat gat cac acc acc acc acc acc acc acc acc a | | 277 | Val | Ile | Gly | Ser | Gly | Phe | Gly | Gly | Leu | Phe | Ala | Val | Gln | Asn | Leu | Lys | |
| 281 Asp Ala Asp Val Asp Val Asp Ile Thr Leu Ile Asp Arg Thr Asn His His Leu 282 35 40 45 284 ttc cag ccg ttg ctt tac caa gta gca acc ggt atc ttg tcg tct ggt 192 285 Phe Gln Pro Leu Leu Tyr Gln Val Ala Thr Gly Ile Leu Ser Ser Gly 286 50 288 gaa atc gca cca caa acg cgt caa gtt ctt gca cag caa aat aat gtg 289 Glu Ile Ala Pro Gln Thr Arg Gln Val Leu Ala Gln Gln Asn Asn Val 290 65 292 cac gtt ctt aag gct gaa gtc acc gac att gac acc gaa tcg acg 293 His Val Leu Lys Ala Glu Val Thr Asp Ile Asp Thr Glu Ser Lys Thr 294 85 296 gtc gtc gca gac ttg gat gat tat tct aaa aca att gaa tac gat tcc 297 Val Val Ala Asp Leu Asp Asp Tyr Ser Lys Thr Ile Glu Tyr Asp Ser 298 300 ctg atc gtc gcc gct ggt gca ggt cag tct tac ttc gga aat gac acc 384 301 Leu Ile Val Ala Ala Ala Gly Ala Gly Gln Ser Tyr Phe Gly Asn Asp His 302 305 Phe Ala Glu Phe Ala Pro Gly Met Lys Thr Ile Asp Asp Ala Leu Glu 306 ttc gcc gcc gct gcc gcc gcc gcc gcc gcc | | 278 | | | | 20 | | • | | | 25 | | | | | 30 | | | |
| 282 | | 280 | gat | gca | gat | gtc | gat | atc | acc | ctc | atc | gac | cgg | aca | aac | cac | cac | ctt | 144 |
| 284 ttc cag ccg ttg ctt tac caa gta gta acc gt acc gt ttg ctt tac caa gta gta acc gt atc ttg tcg tct ggt 285 Phe Gln Pro Leu Leu Tyr Gln Val Ala Thr Gly Ile Leu Ser Ser Gly 286 50 | | 281 | Asp | Ala | Asp | Val | Asp | Ile | Thr | Leu | Ile | Asp | Arg | Thr | Asn | His | His | Leu | |
| 285 Phe Gin Pro Leu Leu Tyr Gin Val Ala Thr Gly Ile Leu Ser Ser Gly 286 50 55 55 60 288 gaa atc gca cac aca ac acg cgt cac gtt ctt gca cac cac aca act gtg 240 289 Glu Ile Ala Pro Gin Thr Arg Gin Val Leu Ala Gin Gin Asn Asn Val 290 65 70 70 70 70 70 70 70 70 70 70 70 70 70 | | 282 | • | | 35 | | | | , | 40 | | | | | 45 | | | | |
| 286 | | | | _ | _ | _ | | | | _ | _ | | | | _ | _ | | | 192 |
| 288 gaa atc gca cca caa acg cgt caa gtt ctt gca cag caa aat aat gtg 289 Glu Ile Ala Pro Gln Thr Arg Gln Val Leu Ala Gln Gln Asn Asn Val 290 65 70 70 765 80 7292 cac gtt ctt aag gct gaa gtc acc gac att gac acc gaa tcg aa gcg 288 293 His Val Leu Lys Ala Glu Val Thr Asp Ile Asp Thr Glu Ser Lys Thr 294 85 90 95 95 95 96 gtc gca gac ttg gat gat tat tct aaa aca att gaa tac gat tcg 336 297 Val Val Ala Asp Leu Asp Asp Tyr Ser Lys Thr Ile Glu Tyr Asp Ser 100 105 110 5 110 5 110 300 ctg atc gtc gcc gct ggt gca ggt cag gtt tat tct aca ac act gac att gaa at gat cac 384 301 Leu Ile Val Ala Ala Gly Ala Gly Gln Ser Tyr Phe Gly Asn Asp His 302 115 120 125 125 125 120 125 125 120 125 125 120 125 125 120 125 125 126 125 126 125 126 125 126 125 126 125 125 126 125 125 126 125 125 126 125 125 126 125 125 126 125 125 126 125 125 125 125 125 125 125 125 125 125 | | 285 | Phe | Gln | Pro | Leu | Leu | Tyr | Gln | Val | Ala | Thr | Gly | | Leu | Ser | Ser | Gly | |
| 289 Glu Tle Ala Pro Gln Thr Arg Gln Val Leu Ala Gln Gln Asn Asn Val 290 65 70 70 80 70 70 70 70 70 | | | | | | | | | _ | | | | | | | | | | |
| 290 65 70 70 75 75 80 222 222 222 222 222 223 234 234 244 | | | _ | | _ | | | _ | _ | | _ | | _ | _ | | | | | 240 |
| 292 cac gtt ctt aag gct gaa gtc acc gac att gac acc gac att gac acc gaa tcg aag acg 288 293 His Val Leu Lys Ala Glu Val Thr Asp Ile Asp Thr Glu Ser Lys Thr 294 85 90 95 95 296 gtc gtc gca gac ttg gat gat tat tct aaa aca att gaa tac gat tcc 336 297 Val Val Ala Asp Leu Asp Asp Tyr Ser Lys Thr Ile Glu Tyr Asp Ser 100 100 100 100 100 100 100 100 100 10 | | | | | Ala | Pro | | | _ | Gln | Val | Leu | | | Gln | Asn | Asn | | |
| 293 His Val Leu Lys Ala Glu Val Thr Asp The Asp Thr Glu Ser Lys Thr 95 | • • • | | | | | | | | | | , | | | • | • | | • | | |
| 294 | in Manager to the second se | | | - | | _ | | _ | _ | | _ | | _ | | | | | | 288 |
| 296 gtc gtc gtc gca gac ttg gat gat tat tct aaa aca att gaa tac gat tcc 336 | | | His | Val | Leu | Lys | | Glu | Val | Thr | Asp | | Asp | Thr | GIu | Ser | | Tnr | |
| 297 Val Val Ala Asp Leu Asp Asp Tyr Ser Lys Thr Ile Glu Tyr Asp Ser 298 | | | | | | | | | • | | | | | | | • | | | 226 |
| 298 | | | _ | _ | _ | _ | _ | • | _ | | | | | | _ | | _ | | 336 |
| 300 ctg atc gtc gcc gct ggt gca ggt cag tct tac ttc gga aat gat cac 384 301 Leu Ile Val Ala Ala Gly Ala Gly Gln Ser Tyr Phe Gly Asn Asp His 302 | | | Val | Val | Ala | | Leu | Asp | Asp | Tyr | | гàг | Thr | тте | GIU | =- | Asp | ser | |
| 301 Leu Ile Val Ala Ala Gly Ala Gly Gln Ser Tyr Phe Gly Asn Asp His 302 | | | | | | | | | | | | مال بعد مال | . | | | | | | 204 |
| 302 | | | _ | | _ | _ | _ | | _ | | | | | | | | _ | _ | 384 |
| 304 ttc gcg gaa ttc gcg ccg ggt atg aaa aca atc gat ggt gca ctc gaa 432 305 Phe Ala Glu Phe Ala Pro Gly Met Lys Thr Ile Asp Asp Ala Leu Glu 306 130 135 145 140 308 ctg cgt gcg cgc atc atc ggc gct ttc gaa cgc gca gaa atg tgc gaa 480 309 Leu Arg Ala Arg Ile Ile Gly Ala Phe Glu Arg Ala Glu Met Cys Glu 310 145 150 150 160 312 gat ccc aaa gaa cgt gaa cgc ctc ttg act ttt gtt atc gtt ggc gca 528 313 Asp Pro Lys Glu Arg Glu Arg Leu Leu Thr Phe Val Ile Val Gly Ala 314 165 170 175 317 gga cca aca ggc gta gaa ctt gca ggt cag ctg ctg gac atg gac cac 576 318 Gly Pro Thr Gly Val Glu Leu Ala Gly Gln Leu Ala Glu Met Ala His 319 180 185 190 321 cgc acg ttg tct gga gag tac acg cag ttc acg cct tcc aac gcg aag 624 322 Arg Thr Leu Ser Gly Glu Tyr Thr Gln Phe Thr Pro Ser Asn Ala Lys 323 195 200 325 atc atc ctg ctt gac ggc gct cct cag gtg ctt ccc acg gtg ctc ccc cag acg acg acg 672 326 Ile Ile Leu Leu Asp Gly Ala Pro Gln Val Leu Pro Pro Phe Gly Lys 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | ьeu | TTE | | Ата | Ala | GIY | Ala | _ | GIII | ser | туг | Pne | | ASII | Asp | HIS | |
| 305 Phe Ala Glu Phe Ala Pro Gly Met Lys Thr Ile Asp Asp Ala Leu Glu 306 | | | | ~~~ | | ++~ | ~~~ | 000 | ~~+ | · - | 222 | 202 | 250 | ~~+ | - | ~~~ | ata | ~ 2 2 | 422 |
| 306 | | | | | _ | | | _ | | _ | | | | _ | | | | | 432 |
| 308 ctg cgt gcg cgc atc atc ggc gct ttc gaa cgc gca gaa atg tgc gaa 480 309 Leu Arg Ala Arg Ile Ile Gly Ala Phe Glu Arg Ala Glu Met Cys Glu 310 145 | | | Pile | | GIU | FIIE | Ата | PIO | _ | MEC | ηλs | 1111 | 116 | | ASP | ATA | пеп | Giu | |
| 309 Leu Arg Ala Arg Ile Ile Gly Ala Phe Glu Arg Ala Glu Met Cys Glu 310 145 | | | ata | | aca | aaa | ata | ato | - | aat | tta | aaa | cac | | caa | ata | tac | gaa | 480 |
| 310 145 | | | _ | _ | | _ | | | | _ | | _ | - | _ | | _ | _ | _ | 400 |
| 312 gat ccc aaa gaa cgt gaa cgc ctc ttg act ttt gtt atc gtt ggc gca 313 Asp Pro Lys Glu Arg Glu Arg Leu Leu Thr Phe Val Ile Val Gly Ala 314 | | | | n 9 | niu | n-9 | 110 | | CIY | niu | | 01.0 | _ | 111 C | 01 4 | 1100 | Cyb | | |
| 313 Asp Pro Lys Glu Arg Glu Arg Leu Leu Thr Phe Val Ile Val Gly Ala 314 | | | | CCC | aaa | даа | cat | | cac | ata | t.t.a | act | | at.t. | atc | at.t. | aac | | 528 |
| 314 | | | _ | | | _ | _ | _ | _ | | _ | | | _ | | _ | | | |
| 317 gga cca aca ggc gta gaa ctt gca ggt cag ctg gcc gaa atg gca cac 576 318 Gly Pro Thr Gly Val Glu Leu Ala Gly Gln Leu Ala Glu Met Ala His 319 | | | 1125 | | . — <u>.</u> . | | _ | | | | | | | | | | _ | | |
| 318 Gly Pro Thr Gly Val Glu Leu Ala Gly Gln Leu Ala Glu Met Ala His 319 | | | qqa | cca | aca | aac | - | qaa | ctt | qca | aat | | cta | qcc | qaa | atq | | cac | 57 <i>6</i> |
| 319 | | | | | | | _ | _ | | | | _ | _ | _ | _ | | _ | _ | |
| 321 cgc acg ttg tct gga gag tac acg cag ttc acg cct tcc aac gcg aag 624 322 Arg Thr Leu Ser Gly Glu Tyr Thr Gln Phe Thr Pro Ser Asn Ala Lys 323 195 200 205 325 atc atc ctg ctt gac ggc gct cct cag gtg ctt cca ccg ttc ggc aag 672 326 Ile Ile Leu Leu Asp Gly Ala Pro Gln Val Leu Pro Pro Phe Gly Lys 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | 4 | | | _ | | | | | _ | | | | | | | | |
| 322 Arg Thr Leu Ser Gly Glu Tyr Thr Gln Phe Thr Pro Ser Asn Ala Lys 323 195 200 205 325 atc atc ctg ctt gac ggc gct cct cag gtg ctt cca ccg ttc ggc aag 672 326 Ile Ile Leu Leu Asp Gly Ala Pro Gln Val Leu Pro Pro Phe Gly Lys 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | cqc | acq | ttq | | qqa | qaq | tac | acq | | ttc | acq | cct | tcc | aac | gcg | aag | 624 |
| 323 195 200 205 325 atc atc ctg ctt gac ggc gct cct cag gtg ctt cca ccg ttc ggc aag 672 326 Ile Ile Leu Leu Asp Gly Ala Pro Gln Val Leu Pro Pro Phe Gly Lys 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | _ | _ | _ | | | | | _ | _ | | | | | | | | |
| 326 Ile Ile Leu Leu Asp Gly Ala Pro Gln Val Leu Pro Pro Phe Gly Lys 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | J | | | | • | | - | | | | | | | | | - | |
| 326 Ile Ile Leu Leu Asp Gly Ala Pro Gln Val Leu Pro Pro Phe Gly Lys 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | atc | atc | ctq | ctt | gac | ggc | gct | cct | caq | gtg | ctt | cca | ccg | ttc | ggc | aag | 672 |
| 327 210 215 220 329 cgt ttg ggt cgt act gca cag cgt gaa tta gaa aag att ggt gta acg 720 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | | | _ | | _ | | _ | | _ | _ | | | _ | | | _ | |
| 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | | | | | - | - | | | | | | | | | - | _ | |
| 330 Arg Leu Gly Arg Thr Ala Gln Arg Glu Leu Glu Lys Ile Gly Val Thr | | | cqt | | gat | cqt | act | gca | caq | cqt | gaa | tta | gaa | aaq | att | ggt | gta | acg | 720 |
| | • | | _ | _ | | | | | | - - | - - | | - - | | | | | | |
| | | | _ | | • | - | | | | _ | | | | - | | • | | | |

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/10/590,705

DATE: 09/05/2006 TIME: 15:10:32

Input Set : A:\5.1301 Sequence Listing.txt
Output Set: N:\CRF4\09052006\J590705.raw

Invalid <213> Response:

Use of "Artificial" only as "<213> Organism" response is incomplete, per 1.823(b) of New Sequence Rules. Valid response is Artificial Sequence.

Seq#:1,2

VERIFICATION SUMMARY

DATE: 09/05/2006

PATENT APPLICATION: US/10/590,705

TIME: 15:10:32

Input Set : A:\5.1301 Sequence Listing.txt
Output Set: N:\CRF4\09052006\J590705.raw

L:9 M:270 C: Current Application Number differs, Replaced Current Application No
L:9 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:41 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:3, CDS LOCATION:
L:269 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:5, CDS LOCATION:
L:490 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:7, CDS LOCATION:
L:701 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:9, CDS LOCATION:
L:906 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:11, CDS LOCATION:
L:1113 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:13, CDS LOCATION:
L:1326 M:351 W: Sequence data Name/Key Feature Out-of-Range, SEQ ID#:15, CDS LOCATION: